Center for Safety Equity in Transportation
If you have a right to get there, you have a right to get there safely.
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Semi-Annual Progress Report for University Transportation Centers

Submitted to:	Office of the Assistant Secretary for Research and Technology U.S. Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590
Project Title:	**Tier 1 University Transportation Center for Safety Equity in Transportation (CSET)**
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Signature:	

Billy Connor
CSET, Director

Abbreviations

- AKDOT&PF – Alaska Department of Transportation and Public Facilities
- ANTHC – Alaska Native Tribal Health Consortium
- AUTC – Alaska University Transportation Center
- CSET – Center for Safety Equity in Transportation
- GIS – Geographic Information System
- ORCiD – Open Researcher and Contributor ID
- PI – Principle Investigator
- PPPR – Program Progress Performance Report
- RiP – Research in Progress
- RITI – Rural, Isolated, Tribal, Indigenous
- UAF – University of Alaska Fairbanks
- UHM – University of Hawai'i Manoa
- UI – University of Idaho
- UW – University of Washington

1. Accomplishments

What are the major goals and objectives of the program?

The goal of CSET is to develop context-sensitive transportation solutions that address the safety needs of RITI communities. The Center will develop safety approaches that are sensitive to heritage, traditional ways of knowing and learning, and the preservation of culture. The mission of the Center for Safety Equity in Transportation (CSET) is to provide everyone with fair and equitable access to a safe transportation system.

What was accomplished under these goals?

During the past six months of the project:

- *Email list, website, and social media*

The official CSET email, cset.utc@alaska.edu, has been used to communicate with Executive and Advisory Board members as well as project PIs. A contact list is being maintained for the duration of the project. Center announcements are distributed through emails and social media posts to various audiences and stakeholders. Activities are posted to the website in a timely fashion.

- *Communication*

Zoom is being used for meetings and webinars. The access to Zoom is provided by the University of Alaska Fairbanks at no cost to the Center. CSET webinar series presented 4 webinars during the reporting period. Plans are in progress to continue the series until the end of the center.

- *E-newsletters*

The Center distributed a newsletter in April 2022. All issues of the newsletter are available under the *Publications* section of the website. http://cset.uaf.edu/publications/

- *Research projects*

Thirty projects were active during this reporting period. One final report was submitted to TRID during the reporting period.

- *Training programs*

- *Active student internships*

None developed during this period.

- *Teacher training and curriculum development activities*
  - The project, *Community-embedded Drone Program for Improving Traffic Safety of RITI Communities in Washington State*, held weekly meetings with the staff of the Ocosta High School in Westport, Washington, the local community and after-school volunteers to discuss course content for the after-school drone program. The group developed a draft program overview, education plan and recruiting materials. Two

case studies developed to work with the students to complete, city park photography and inspection and flood-prone road inspection.

- *Data collection tools developed*
- The UW project, *Developing Pedestrian Safety Data Visualization and Analysis Tool for RITI Communities*, is actively engaged in creating the pedestrian safety tool. The data management and visualization functions have been designed and developed. Improvements are being made based on input from the Yakama Nation Engineering team. Specifically, the project has been working with Yakima Nation DNR engineers on getting the local datasets on pedestrian safety to incorporate into the safety tool.

- *Sponsorship*

Nothing to report for this period.

How have the results been disseminated?

CSET staff and researchers have been actively seeking out opportunities to interact with the public, stakeholders and the transportation community. COVID-19 measures have hampered these efforts, resulting in most activities occurring virtually.

Professional Meetings

During this reporting period in-person meetings were canceled or turned into virtual meetings via online tools due to COVID-19. CSET representatives participated in the following professional events:

- The InfraNorth Workshop on *Arctic Infrastructures: Histories of Exploration, Colonization and Industrial Development*, June 14-15, 2022. Luleå University of Technology, Sweden.
- The 2022 Affiliated Tribes of Northwest Indians Annual Meeting, September 18-22, 2022. Tulalip, Washington.
- The 2022 National Transportation in Indian Country Conference, August 22-26, 2022. Louisville, Kentucky.

Outreach

- Nathan Belz was interviewed as part of a safety outreach campaign being conducted by the National Center for Rural Road Safety. His *CSET project, Developing a Low-Cost Open-Source Traffic Counter for Rural Areas (CTRA)*, was highlighted in the interview.
- The UW project, *Developing Data-Driven Pedestrian Safety Assessment Methods for RITI Communities*, has been working with Yakama Nation DNR engineers on the case study for pedestrian safety. In addition to bi-weekly online meetings, the research team has hosted an in-person training/meeting on May 19th, 2022 at the University of Washington STAR Lab with HollyAnna LittleBull, traffic safety

coordinator, and Portia Shields, Data Manager of Yakama Nation. The meeting discussed the current pedestrian safety issues in Yakama Nation, and potential data sources to collect.

- The project, *Community-embedded Drone Program for Improving Traffic Safety of RITI Communities in Washington State,* continued to run the Ocosta High School after-school program focused on teaching drone piloting skills and drone applications.

What do you plan to do during the next reporting period to accomplish the goals and objectives?

We will follow the implementation plan to ensure that all the CSET's funded research, education, and outreach activities move forward as scheduled.

- The Center website, social media presence, and emailing contact lists will be regularly updated and used to promote the Center and its activities.
- CSET's newsletter will be distributed during when content is available. The newsletters will highlight Center progress, such as projects starting/concluding, new calls for proposals, STIs, etc.
- Steps will be taken to continue bringing students on as research assistants.
- Steps will be taken to develop training programs, curriculum development activities, outreach, and sponsorship opportunities.
- CSET's webinar series will continue to sponsor presentations on the results of the research performed by the Center.

2. Participants & Collaborating Organizations

What organizations have been involved as partners?

- *Collaborative research and financial support*

Newtok Village Council, Newtok Alaska,
Kawarek, Inc., Nome, Alaska
Yakama Nation, Washington

- *Technology Transfer Expert Task Groups*

CSET projects have established advisory groups for improving technology transfer from the project to interested stakeholders. Each project has met with members of the groups either individually or in a group during the period covered by this report.

Have other collaborators or contacts been involved?
Email correspondence has been exchanged during the reporting period to discuss research ideas and broad collaborations on research, education, workforce development, and outreach activities between CSET and various collaborators.

3. Outputs

Publications, conference papers, presentations, websites, lectures, seminars, workshops, invited talks

Publications

- *Journal Publications*
  - Richards, E., Stuefer S.L., Rangel R.C., Maio, C., Belz, N., Daanen R., 2022, *An evaluation of GPR monitoring methods on varying river ice conditions: a case study in Alaska*, Cold Regions Science and Technology, in review.

- *Reports*
  - Zhang, Guohui, Hanyi Yang, Hao Yu, Zhenning Li, Rong zou, Runze Yuan,Panos Prevedouros, and Tianwei Ma, *Extracting Rural Crash Injury and Fatality Patterns Due to Changing Climates in RITI Communities Based on Enhanced Data Analysis and Visualization Tools (Phase II*). CSET Final Report. October 2022.

- *Conference papers*

- *Presentations*
  - Philip Wight, *Cracking Open the North? Contesting Access on the Dalton Highway, 1968-1994*. Arctic Infrastructures: Histories of Exploration, Colonization and Industrial Development conference. June 14-15, 2022. Luleå University of Technology, Sweden.
  - Samuel Ricord, *USDOT Safety Data Initiative: Comprehensive Roadway Data Visualization and Evaluation Platform*. National Transportation in Indian Country Conference. August 22-26, 2022. Louisville, Kentucky.
  - Philip Wight, *Whose Haul Road? How the Dalton Highway Became Public, 1968-2001*, Alaska Historical Society Annual Conference. October 15, 2022. Anchorage, Alaska.

- *Other Products*

- *Website Updates*
  - The CSET website is live at cset.uaf.edu.
  - Final reports are added to the website once submitted to TRID.
  - The CSET webinar series is available on YouTube at: https://youtube.com/playlist?list=PL5Mnj-QQMwFpEx0W5pc90VW9gp8HrePpR

- *Lectures/Seminars/Workshops/Invited Talks*
  - Jacob Garretson, Logan Prescott, and Ahmed Abdel-Rahim. *Impacting Traffic Safety Culture among Youth in Tribal and Rural Communities: Opportunities and Challenges*. Presented and recorded as a CSET Webinar on April 21, 2022. https://youtu.be/1ATVr8p8o-s

- Panos Prevedouros. *Break-even Analysis of Delivery Service in Rural Areas with Autonomous Vehicles*. Presented and recorded as a CSET Webinar on May 25, 2022. https://youtu.be/9Bke_QicVxM
- Scott Washburn. *Updating Rural Highway Analysis Methods for the Highway Capacity Manual*. Presented and recorded as a CSET Webinar on June 6, 2022. https://youtu.be/SA9yA6eHv4Q
- Kevin Chang. *School Transportation Safety Data Trends and Challenges*. Presented and recorded as a CSET Webinar on July 11, 2022. https://youtu.be/2Kaj62R__1Q

- *New methodologies, technologies or techniques*
  - The UAF project, *Development of a Tabletop Dustfall Column and Test Procedure for Chemical Dust Suppressant Performance Testing*, is in the final stages of testing the mini-column that is the focus of the project. Final step of determining the resolution failed testing, probably due to sample preparation issues. New samples are being prepared and testing will continue.
  - The UAF project, *Improved Safety for Winter Travel along Minimally Improved Routes*, has sent plans for trail markers to Texas A&M for crash worthiness certification.

- *Inventions, patents and/or licenses*
  - None this reporting period

4. Outcomes

- *What outcomes has the program produced? How are the research outputs described in section 3 being used to create outcomes?*

The CSET project, *Extracting Rural Crash Injury and Fatality Patterns Due to Changing Climates in RITI Communities Based on Enhanced Data Analysis and Visualization Tools (Phase II)*, published their final report. The report documents the research activities to investigate the traffic crashes in Rural, Isolated, Tribal, or Indigenous (RITI) communities involving considerable incapacitating injuries and fatalities. The traffic crashes occurring in RITI communities, are different from urban traffic crashes, and are related more to the features like speeding, low application of safety devices (for instance, seatbelt), adverse weather conditions and lacking maintenance and repairs for road conditions, and inferior lighting conditions. Thus, it is necessary to study the properties and attributes of traffic crashes at the RITI area using data analysis methods, such as statistical methods, and data-driven methods. This project analyzed the rural crash injury and fatality patterns caused by changing climates in RITI communities based on enhanced data analysis using latest mathematical methods. The project used a mixed logit model (MLM) to examine the risk factors in determining driver injury severity in four crash configurations in two-vehicle rear-end crashes on state roads based on seven-years of data from the Washington State Department of Transportation. It also developed a latent class mixed logit model (LCM) with temporal indicators to investigate highway single-vehicle crashes and the effects of significant contributing factors to driver injury severity. The differences between the MLM and the

LCM were investigated for exploring the relationships between driver injury severity in the rain-related rural single-vehicle crash and its corresponding risk factors. A careful comparison between the two models was conducted, and the results indicate that the LCM has a slightly better performance in analyzing the datasets in this study.

5. Impact

- *What is the impact on the development of the principal discipline(s) of the program?*

- *Other Disciplines –*

CSET is a multidisciplinary Center, and will therefore have an impact in fields outside of the traditional areas of transportation research. In future reports, this section will serve to answer the following questions.

- *What is the impact on the development of transportation workforce development?*

- *What is the impact on safety in RITI communities?*

The CSET project, *Improved Safety for Winter Travel along Minimally Improved Routes*, installed prototype trail markers along several trails between communities on the Seward Peninsula. The trail markers are having a positive impact on trail users, decreasing the possibility of missing the trail and getting lost or into areas of poor conditions for travel. We are also working with other jurisdictions including Bethel and the North Slope Borough on trail systems. There is a growing desire among the tribes to increase the trail system with the intent to use these systems to create transportation corridors. We are working with these groups with the expectation that others will join to establish trail standards and identify the process required to establish corridors.

- *What is the impact on physical, institutional, and information resources at the university or other partner institutions and communities?*

- *What is the impact on technology transfer?*

The UAF project, *Development of a Tabletop Dustfall Column and Test Procedure for Chemical Dust Suppressant Performance Testing*, has received 3 firm orders with at least 2 additional orders for the column expected. The project is working with the UAF intellectual property protection office to develop a license for users and a patent application.

- *What is the impact on society beyond science and technology?*

- *In what ways have researchers and students who are part of or who focus on native or federally recognized tribes and communities been involved?*

CSET projects at UAF are working closely with Native Alaskans on the trail markings and transportation corridor development in their rural and isolated communities. In addition, transportation safety-issues related to subsistence activities are being explored with Native Alaska communities.

CSET projects at the University of Washington continue to work closely with tribal leaders in the state, including the Yakima Nation, on issues of concern to the tribal leaders.

6. Changes/Problems

- Impacts on the Center from COVID-19
    - Supply-chain issues that have been attributed to the COVID slowdown and recovery have impacted the development of trail markers for the UAF project, *Improved Safety for Winter Travel along Minimally Improved Routes.* The project continues to be unable to get the reflective tape that they planned to add to the next version of trail markers.
    - Multiple projects requested no-cost extensions due to COVID impacts. The reasons included lack of access to lab facilities due to campus closures, delays in the arrival of graduate students, difficulty recruiting undergraduate students and inability to conduct field work for data collection. The ripple effects of the COVID delays continue as work planned for the fall and winter of 2021 was pushed out to 2022.

7. CSET Technology Transfer Plan Metrics

Research Output

- Number of completed projects - 1
- Number of papers and reports directly resulting from research collaborations - 5
- Number of conference presentations from collaborations - 11

Research Outcomes

- Number of collaborative training programs established and number of attendees – 2, attendance was 3 and 10 respectively.
- Number of seminars, meetings, and workshops organized with state, tribal, and local agencies and the number of attendees – 6, 5 to 60+ people in attendance at the events
- Number of implementable work products (e.g., manuals, specifications, and toolkits) - 6

Research Impacts

- Number of organizations/partners actively working with CSET to achieve the strategic RITI-focused goals – 12
- Number of student research internships granted - 12